WHAT IS CLAIMED IS:

1. A compound having the formula:

$$P^1\text{-}X^1\text{-}(W^1)_n\text{-}S\text{-}S\text{-}(W^2)_m\text{-}X^2\text{-}P^2 \quad \text{(I)}$$

wherein

P^1 and P^2 are each members independently selected from the group consisting of a hydrogen atom, an activating group and a protecting group;

X^1 and X^2 are each independently selected from the group consisting of a bond, –O–, –NH–, –NR– and $–CO_2–$, wherein R is a lower alkyl group having one to four carbon atoms;

W^1 and W^2 are each independently selected from the group consisting of methylene, oxyethylene and oxypropylene; and

n and m are each independently integers of from 2 to 12 with the proviso that n and m are not the same when W^1 and W^2 are the same, and with the further proviso that P^1 and P^2 are not both hydrogen atoms.

2. A compound in accordance with claim 1, wherein P^2 is an activating group selected from the group consisting of a phosphoramidite, a trialkylammonium H-phosphonate and a phosphate triester.

3. A compound in accordance with claim 1, wherein P^2 is a phosphoramidite, P^1 is a protecting group selected from the group consisting of acid labile protecting groups, W^1 and W^2 are both methylene, X^1 and X^2 are both –O–, and n and m are each integers of from 2 to 8.

4. A compound in accordance with claim 1, wherein P^2 is a phosphoramidite, P^1 is DMT, W^1 and W^2 are both methylene, X^1 and X^2 are both –O–, and n and m are each integers of from 3 to 8.

5. A modified substrate for use in solid phase chemical synthesis, said substrate having the formula:

$$A^1\text{-}B^1\text{-}L^1 \quad \text{(II)}$$

wherein A^1 is a solid support, B^1 is a bond or a ~~derivatizing~~ Spacer group, and L^1 is a linking group having the formula:

$$P^1\text{–}X^1\text{–}(W^1)_n\text{–S-S–}(W^2)_m\text{–}X^2\text{–} \quad \textbf{(IIa)}$$

wherein,

P^1 is a protecting group;

X^1 and X^2 are each independently selected from the group consisting of a bond, –O–, –NH–, –NR– and $–CO_2–$, wherein R is a lower alkyl group having one to four carbon atoms;

W^1 and W^2 are each independently selected from the group consisting of methylene, oxyethylene and oxypropylene; and

n and m are each independently integers of from 2 to 12 with the proviso that n and m are not the same when W^1 and W^2 are the same.

6. A substrate in accordance with claim 5, wherein P^1 is a photolabile protecting group.

7. A substrate in accordance with claim 5, wherein P^1 is a photolabile protecting group, W^1 and W^2 are both methylene, and X^1 and X^2 are both –O–.

8. A substrate in accordance with claim 5, wherein P^1 is a photolabile protecting group, X^1 and X^2 are both –O–, and n and m are each integers of from 2 to 8.

9. A substrate in accordance with claim 5, wherein P^1 is DMT, X^1 and X^2 are both –O–, W^1 and W^2 are both methylene, and n and m are each integers of from 2 to 8.

10. A method of synthesizing small ligand molecules on a solid support having optional spacers, said small ligand molecules being removable therefrom upon treatment with a suitable disulfide cleaving reagent, said method comprising:

(a) contacting a solid support an unsymmetrical disulfide linking group of formula:

$$P^1\text{–}X^1\text{–}(W^1)_n\text{–S-S–}(W^2)_m\text{–}X^2\text{–}P^2 \quad \textbf{(IIb)}$$

wherein,

P^1 and P^2 are each members independently selected from the group consisting of a hydrogen atom, an activating group and a protecting group;

X^1 and X^2 are each independently selected from the group consisting of a bond, –O–, –NH–, –NR– and $–CO_2–$, wherein R is a lower alkyl group having one to four carbon atoms;

W^1 and W^2 are each independently selected from the group consisting of methylene, oxyethylene and oxypropylene; and

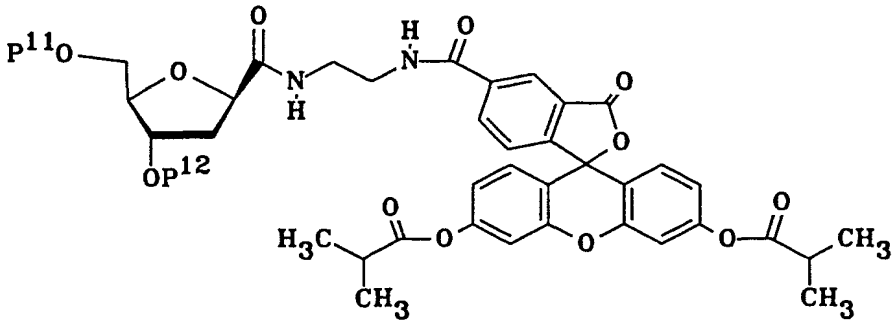
n and m are each independently integers of from 2 to 12 with the proviso that n and m are not the same when W^1 and W^2 are the same;

to produce a derivatized solid support having attached unsymmetrical disulfide linking groups suitably protected with protecting groups;

(b) optionally removing said protecting groups from said derivatized solid support to provide a derivatized solid support having unsymmetrical disulfide linking groups with synthesis initiation sites; and

(c) coupling said small ligand molecules to said synthesis initiation sites on said derivatized solid support to produce a solid support having attached small ligand molecules which are removable therefrom upon application of said disulfide cleaving reagent.

11. A compound of the formula:



(VI)

wherein P^{11} and P^{12} are each independently selected from the group consisting of hydrogen, a protecting group, and a phosphodiester-forming group.

12. A compound in accordance with claim 11, wherein P^{11} and P^{12} are both hydrogen.

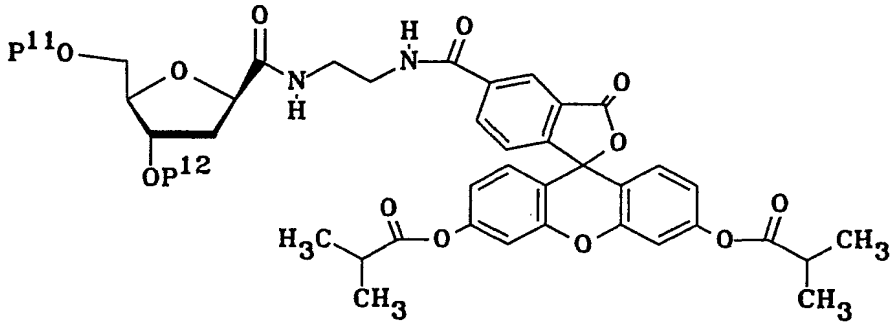
13. A compound in accordance with claim 11, wherein P^{11} is a protecting group and P^{12} is a phosphoramidite.

14. A compound in accordance with claim 11, wherein P^{11} is DMT and P^{12} is a phosphoramidite.

15. A substrate for the solid phase synthesis of oligonucleotides, said substrate having the formula:

$$A^{11}\text{-}B^{11}\text{-}L^{11}\text{-}Fl$$

wherein A^{11} is a solid support, B^{11} is a bond or a derivatizing group, L^{11} is a linking group, and Fl is a fluorescent moiety having the formula:



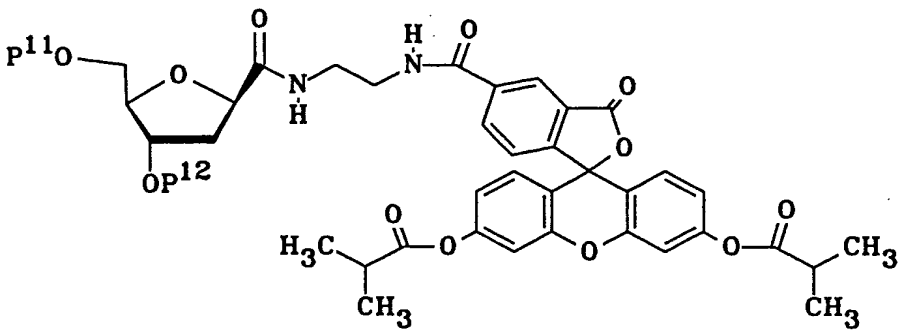
(VI)

wherein one of P^{11} and P^{12} is a covalent bond to L^{11} and the other of P^{11} and P^{12} is selected from the group consisting of hydrogen, a protecting group, and a phosphoramidite.

16. A substrate bound, fluorescently labeled oligonucleotide having the formula:

$$A^{11}\text{-}B^{11}\text{-}L^{11}\text{-}Nu\text{-}Fl$$

wherein A^{11} is a solid support, B^{11} is a bond or a derivatizing group, L^{11} is a linking group, Nu is an oligonucleotide and Fl is a fluorescent moiety having the formula:



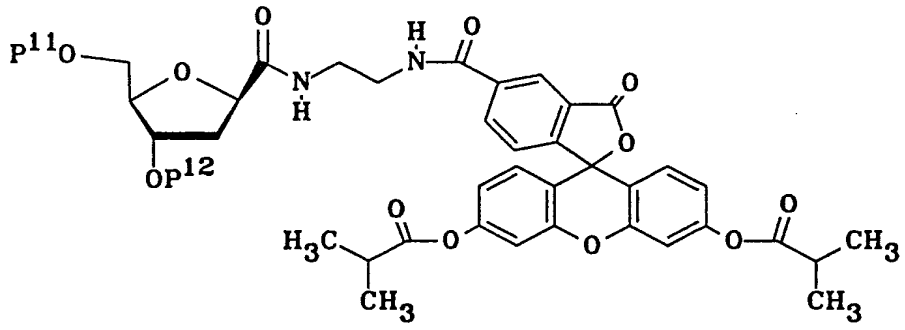
(VI)

wherein one of P^{11} and P^{12} is a covalent bond to L^{11} and the other of P^{11} and P^{12} is selected from the group consisting of hydrogen, a protecting group, and a phosphoramidite.

17. A substrate bound, fluorescently labeled oligonucleotide having the formula:

$$A^{11}\text{-}B^{11}\text{-}L^{11}\text{-}Fl\text{-}Nu$$

wherein A^{11} is a solid support, B^{11} is a bond or a derivatizing group, L^{11} is a linking group, Fl is a fluorescent moiety having the formula:

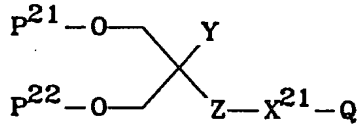


(VI)

wherein each of P^{11} and P^{12} represents a bond; and

Nu is an oligonucleotide.

18. A selectively cleavable linkage molecule useful in solid phase compound synthesis, said linkage molecule having the formula:



wherein

P^{21} and P^{22} are each protecting groups with the provisos that P^{21} can be removed under conditions which will not remove P^{22}, and P^{22} can be removed under conditions which will not remove P^{21};

X^{21} is a linking moiety selected from the group consisting of an alkylene chain and an aryl group;

Y is a substituent selected from the group consisting of –C(=O)R, –S(O)R, $-S(O)_2R$, $-S(O)_2NRR'$, –CN, $-CF_3$, $-NO_2$ and a phenyl ring having one or more substituents selected from the group consisting of halogen, nitro, cyano and trifluoromethyl;

Z is a linking moiety selected from the group consisting of –C(=O)–, –S(O)–, $-S(O)_2-$, $-S(O)_2NR-$,

wherein

R and R' are each independently selected from the group consisting of hydrogen, C_1-C_{12} alkyl and aryl; and

Q is a phosphate ester-forming group selected from the group consisting of a phosphoramidite and a trialkylammonium H-phosphonate.

19. A selectively cleavable linkage molecule in accordance with claim 18, wherein X^{21} is an amino alkoxy group, Y is –C(=O)R, Z is –C(O)– and Q is a phosphoramidite.

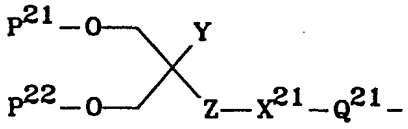
20. A selectively cleavable linkage molecule in accordance with claim 18, wherein P^{21} is removable under photolytic conditions, P^{22} is removable under acidic conditions, X^{21} is an amino alkoxy group, Y is –C(=O)R, Z is –C(O)– and Q is a phosphoramidite.

21. A selectively cleavable linkage molecule in accordance with claim 18, wherein P^{21} is MeNPOC, P^{22} is DMT, X^{21} is $-NH-CH_2CH(CH_3)-O-$, Y is $-C(=O)R$, Z is $-C(O)-$ and Q is a phosphoramidite.

22. A modified substrate for use in solid phase chemical synthesis, said substrate having the formula:

$$L^{21}-B^{21}-A^{21}$$

wherein A^{21} is a solid support, B^{21} is a bond or a derivatizing group, and L^{21} is a linking group having the formula:



wherein

P^{21} and P^{22} are each protecting groups with the provisos that P^{21} can be removed under conditions which will not remove P^{22}, and P^{22} can be removed under conditions which will not remove P^{21};

X^{21} is a linking moiety selected from the group consisting of an alkylene chain and an aryl group;

Y is a substituent selected from the group consisting of $-C(=O)R$, $-S(O)R$, $-S(O)_2R$, $-S(O)_2NRR'$, $-CN$, $-CF_3$, $-NO_2$ and a phenyl ring having one or more substituents selected from the group consisting of halogen, nitro, cyano and trifluoromethyl;

Z is a linking moiety selected from the group consisting of $-C(=O)-$, $-S(O)-$, $-S(O)_2-$, $-S(O)_2NR-$,

wherein

R and R' are each independently selected from the group consisting of hydrogen, C_1-C_{12} alkyl and aryl; and

Q^{21} is a phosphate ester linking group.